Safetygram

FNLCR

ISM-210 Laboratory August 2012

Pyrophoric Liquid Hazards

On January 16, 2009 a 23-year old UCLA research assistant died due to serious burns resulting from a spill and fire of a pyrophoric chemical (t-butyllithium).

Recent incidents at FNL highlight the importance of working safely with pyrophoric liquids.

Pyrophoric chemicals are highly flammable and can spontaneously ignite in air. They also tend to be associated with flammable solvents. Other common hazards include corrosivity, water reactivity, peroxide formation, toxicity, and damage to the liver, kidneys, and central nervous system. Some examples are tert-butyllithium, Grignard reagents, alkylaluminum reagents, boranes, and diisobutylaluminum hydride.

Laboratory supervisors are responsible for ensuring that researchers are fully trained and fully understand the safe operating procedures before handling pyrophoric materials. EHS strongly suggests developing written standard operating procedures (SOPs) and doing dry runs before working with pyrophoric materials. Reading procedures does not substitute for hands-on training. New users of pyrophoric reagents must work under the close supervision of an experienced user. BEFORE working with pyrophoric reagents, read the relevant Material Safety Data Sheets (MSDS) and understand the hazards. The MSDS must be reviewed before using an unfamiliar chemical and periodically as a reminder, and EHS is available to review SOPs and help supervisors with their training responsibilities.

- All manipulations of pyrophoric chemicals should occur in a fume hood with the sash in the lowest feasible position; a splash shield will provide additional protection.
- Chemical splash goggles or safety glasses that meet the ANSI Z.87.1 1989 standard must be worn whenever handling pyrophoric chemicals. Ordinary prescription glasses will NOT provide adequate protection unless they also meet this standard. When there is the potential for splashes, liquid-tight goggles or glasses in conjunction with a face shield must be worn.
- Nitrile gloves should be resistant to degradation by most commonly-used pyrophoric materials in a general laboratory setting, but note that nitrile gloves are combustible. Use a heavy, long, cuffed nitrile glove over top of the standard laboratory thickness glove. Use proper donning and doffing glove procedures in order to prevent inadvertent skin exposures. (provide a reference on how to remove a glove?)
- *A fully-fastened, fire resistant (marked "FR" on the label) lab coat must be worn, along with long pants and closed-toe shoes*.
- A chemical-resistant apron and sleeves worn over the lab coat is required for working with large quantities (greater than ml volumes).
- Use a cannula or syringes equipped with Luer-locks to secure needles.
- Clamp the reagent bottle and the receiving vessel to prevent tipping and to allow the free use of both hands.
- Oven dry glassware used for pyrophorics to avoid inadvertent contact with water.

- Carefully remove nearby flammable materials before starting work with these chemicals.
- Pyrophoric materials and flammable liquids should not be stored together. Use secondary containment for storage of all such liquids.
- Know the location of the nearest fire extinguisher.
- Call 911 for emergency assistance if necessary.
- If anyone is exposed, or on fire, wash with copious amounts of water in the nearest emergency shower or stop, drop, and roll to extinguish flames.
- Keep working quantities to a minimum. Store and use the minimum for the operation. Contact EHS to dispose of excess pyrophoric materials.
- Do not stockpile pyrophoric chemicals and conduct periodic cleanouts to prevent accumulating unneeded pyrophoric chemicals.
- Call EHS Waste Management x5718 to remove old or unused chemicals. Specifically alert EHS personnel at the collection location to the hazards of any wastes containing pyrophoric chemicals.

See the following links for more information on pyrophoric use and transfer techniques:
http://www.chemistry.ucla.edu/file-storage/publicview/pdfs/SOPLiquidReagents.pdf
http://www.lbl.gov/ehs/chsp/html/pyrophorics.shtml